

The Cooperative Institute of Marine and Atmospheric Studies (CIMAS)

RESEARCH REVIEW TEAM DATA REQUEST JOINT INSTITUTE QUESTIONS

1.) Please provide the Mission, and a brief history of your Joint Institute (JI).

The CIMAS Mission:

- *To conduct research in the terrestrial, ocean, and atmospheric environment within the general context of the NOAA's mission;*
- *To focus on the physical, chemical, and biological interactions between and among these environments;*
- *To understand the role of humans in affecting these environments and the impact of the changes in the environment on humans;*
- *To facilitate and participate-in education programs that are grounded in advanced Earth System Science.*

The Cooperative Institute of Marine and Atmospheric Studies (CIMAS) is a research institute at the University of Miami (UM) located in the Rosenstiel School of Marine and Atmospheric Science (RSMAS). CIMAS is sponsored jointly by the University of Miami (UM) and the National Oceanic and Atmospheric Administration (NOAA) through NOAA's Office of Oceanic and Atmospheric Research (OAR), a line office in NOAA also known as "NOAA Research". CIMAS was established in 1977 through a Memorandum of Understanding (MOU) between NOAA and the University of Miami. As an Institute of the University, CIMAS operates under the same policies and procedures as those that apply to the other units of the University.

The scientific activities in CIMAS are organized under broad Research Themes whose scientific objectives are guided by NOAA's Strategic Plan. *Theme 1: Climate Variability; Theme 2: Fisheries Dynamics; Theme 3: Regional Coastal Ecosystem Processes; Theme 4: Human Interactions with the Coastal Environment; Theme 5: Air-Sea Interactions and Exchanges; Theme 6: Integrated Ocean Observations*

2.) The total amount of NOAA funding in the last full year of the CIMAS academic period is \$5,508,791.

a) Linda will provide information

b) " " " "

c) Short term 30%, medium term 30%, long term 40%

d) What is the geographic scope of your research - regional, national or global? (Please explain)

CIMAS is involved in research on all scales.

Regional: CIMAS scientists are engaged in many projects associated Florida's environment. We are major participants in the South Florida Restoration program which focuses on the Everglades and Florida Bay and adjoining coastal waters.

National: CIMAS scientists participate in research programs that relate to the climate of the eastern US. An example is the research associated with the evolution of tropical storms and hurricanes which impact on a large area of the southern and eastern US. They are also involved in ocean/atmosphere studies in the Caribbean and Gulf of Mexico that relate to

large-scale climate processes that affect the central and eastern US.

Global: CIMAS scientist are heavily involved in climate studies that impact large regions of the earth. These include ENSO studies and linkages between Atlantic and Pacific climate. We are engaged in global-ocean observations, for example, drifters and Volunteer Observing Ships (VOS) which provide essential observations for weather forecasts and for tracking longer term trends in climate. We also are heavily involved in ocean carbon cycle studies, critical to our understanding and predicting trends of atmospheric CO₂.

3.) The percentage of the total CIMAS funding that comes from NOAA is about 96.6%.

4.) What is the unique expertise that the JI brings to NOAA. (e.g. special scientific skills)

Theme 1:

- Meteorology of the tropical Atlantic; evolution of easterly waves, tropical cyclones and storms, hurricanes.
- Atlantic climate variability and the relationship to tropical storm activity
- Study of the dynamics and impacts of coupled atmosphere/ocean/land systems and impact on climate variability and change.
- Variability of the El Niño-Southern Oscillation (ENSO) and Atlantic climate and the linkage between the Pacific ENSO and tropical Atlantic variability.
- Water and heat transport in the global ocean and the impact of these transports on climate.
- Ocean-atmosphere carbon cycle and the role of the oceans in CO₂ exchanges
- Connection among the warm pool of the Intra-Americas Sea (IAS), its moisture budget, moisture transport from the IAS into North America, and warm-season precipitation over North America.
- Ocean circulation and its variability based on data from a global array of surface drifting buoys

Theme 2

- The impact on Florida Bay of upstream water management changes resulting from efforts to restore the Greater Everglades ecosystem.
- Recruitment processes and larval ecology of marine fishes and crustaceans in South Florida's marine ecosystems based on field studies and modeling.
- Using the chemical composition of otoliths (ear bones) as natural tags of fish habitat history; life history, and habitat requirements of gray snapper within Florida Bay and the Florida Reef Tract.
- Development of fisheries management strategies in coral reef ecosystems based on functional bio-physical relationships and processes that control and impact planktonic processes associated with reef ecosystems
- Fisheries studies in the South Florida Ecosystem Restoration Program to provide a comprehensive 5-yr evaluation of trends in FKNMS no-take zones (Sanctuary Preservation Areas - SPAS), Ecological Reserves, and Research Areas
- The use of photographic identification techniques to develop a long-term database on bottlenose dolphin population parameters

THEME 3

- Coral reef monitoring systems in distributed station networks using sensors and cameras which broadcast in real time over the website interface
- Develop monitoring capabilities for the environmental characteristics in Biscayne Bay and to relate these to the distribution and abundance of various target species, for example fish and macro-invertebrates, in seagrass habitats and the relationship to variations in shrimp distribution and abundance
- Development of real-time observations of important oceanographic parameters at various sites

throughout the Florida Keys National Marine Sanctuary (FKNMS) so as to develop an understanding of the forces driving the currents that impact on the regional ecosystems

- Studies of circulation and exchange rates influencing salinity variability in the eastern and western regions of Florida Bay so as to better understand and predict the future effects of proposed changes to water delivery to the bay as part of Everglades restoration plans
- Studies of the influence of variable environmental conditions on larval behavior and survival in coral reef ecosystems and the development of reef management strategies
- Coral reef mortality: sources of mortality affecting juvenile and remnant *Acropora palmata* and *A. cervicornis* populations and their relative importance to the population survival and growth.
- Quantify community and reef fish population changes in KFNMS management zones under different levels of protective management; model the effects of the Everglades Restoration on coral reef fishes and the effectiveness of restoration in terms of ecological recovery

THEME 4

- Multidisciplinary assessment of the consequences of seasonal-to-interannual climate variability linked to the El Niño-Southern Oscillation (ENSO) phenomenon on agriculture; development of tools and methodologies for the effective use of ENSO-related climate forecasts in agriculture.
- Development of an analysis framework for statistical evaluation of fishery management strategies.
- Application of advanced biotechnology to water quality monitoring; development of improved methods of monitoring for harmful algal blooms and bacterial contamination.

THEME 5

- Measurement of boundary layer sea-air energy fluxes and the impact of these fluxes on the evolution of tropical storms and hurricanes; measurements of turbulence fluxes from the NOAA P3 aircraft during hurricanes
- Evaluating microphysical parameterization schemes in tropical storms and hurricane environments; use of these schemes in hurricane models to improve predictions
- Real-time hurricane wind analysis to improve our understanding of tropical cyclones; develop advanced computing technology tools to disseminate data rapidly to users and the public
- The role of sea-surface temperature and the heat content of the ocean mixed layer in the development of hurricanes; improved predictions of hurricane intensity based on a better understanding of the physical processes that control hurricanes especially the exchanges of heat, momentum and moisture at the air-sea interface
- The use radar altimeter data to estimate oceanic heat content for use in hurricane forecasting as a part of the Joint Hurricane Testbed

THEME 6

- Global ocean observations for understanding and prediction of climate variability based on the global ocean drifter program; observational studies designed to improve our understanding of interannual to multidecadal ocean variability
- Study the upper-ocean thermal structure of the North Atlantic using an extensive array of XBT monitoring programs aboard Volunteer Observing Ships (VOS)

5.) Staff funded by NOAA

24 Research Associates levels

3 Senior Research Associates

5 Postdoctoral Associates

4 Assistant Scientists

1 Associate Scientist

1 Director
1 Associate Director
1 Administrative Assistant
1 Staff Associate
1 Staff Assistant